SCIENTIFIC SERIALS

THE *Journal of the Chemical Society* for October contains but one paper communicated to the Society, viz., a lengthy communication on the chemistry of tartaric and citric acids, by Mr. R. Warington. The author has had considerable experience in the manufacture of these acids, having been for some years chemist to the factory of Mr. J. B. Lawes. The author's experiments prove that the citric acid of commerce contains one molecule of water corresponding to the formula $C_6H_8O_7$, H_2O. Some interesting results have been brought to light in the course of some experiments made with a view to determine the water of crystallisation in various samples of the acid. Thus in one determination a specimen of the powdered acid lost the whole of its water over sulphuric acid in a few days, at a temperature of 16°. In another experiment the powdered acid lost but a mere trace of water *in vacuo* over vitriol for some days, while the same acid heated to 100° lost its normal amount of water. Results of an equally contradictory nature were obtained with various other samples of the acid tried at subsequent periods. It has been proved also that a strong solution of citric acid undergoes considerable contraction when mixed with water.—The next section of the paper relates to the acidity and commercial value of the different lime, lemon, and bergamot juices supplied for the manufacture of citric acid. The nature of some of the acids existing in the concentrated juices is to be made the subject of further research; up to the present time, in addition to citric, formic, acetic, and possibly propionic, acids have been detected. It appears, however, that the organic acids other than citric which exist in the juice are chiefly non-volatile, and have soluble calcium salts. Phosphoric acid has also been found, and there is reason to suspect malic and aconitic acids, the latter being produced by the concentration of the juice. With regard to calcium citrate, it has been found that the amount of water contained in this salt varies according to the mode of preparation, a result demanding further investigation. The author next gives details of the method employed for analysing the citric acid liquors. With regard to tartaric acid, it is found that a strong solution contracts even more than citric acid when mixed with water. The author then proceeds to consider the qualitative reactions of tartaric, metatartaric, and ditartaric acids. Contrary to the statement given in books, it has been found that calcium acetate yields a crystalline precipitate of calcium tartrate, even in dilute solutions of tartaric acid. Free tartaric acid also is precipitated by calcium chloride in the presence of alcohol. The reactions with the acetates of lead and barium have likewise been studied. With regard to the amount of water in calcium tartrate, the author concludes that the salt has no definite composition at 100°. A very complete series of experiments upon the solubility of potassium bitartrate has been made, and the remainder of the paper is devoted to the materials used for the manufacture of tartaric acid, viz. lees, argol, and tartar, and the methods of analysis employed in their valuation. Mr. Warington deserves credit for thus contributing to the general store of knowledge from the experience gained in the chemical factory. A great deal of manufacturing chemistry is at present carried on without any regard to the scientific principles involved, and if manufacturers would only be somewhat more free in communicating apparently inexplicable facts to the scientific world, the advantage gained could not but be mutually beneficial. To quote the author's own words:—"A large amount of information is acquired in the laboratories of our great manufacturing concerns; most of this might be published without any injury to the individual manufacturer. Especially is this true of analytical methods, and the publication and discussion of these would do much to remove the disgrace to which science is often subjected from the wide discrepancies of commercial analyses." We cordially echo the hope "that the publication of these notes may lead to many similar communications."—The remainder of this part is occupied by abstracts of papers from British and foreign journals.

Poggendorff's Annalen der Physik und Chemie, No. 10, 1875. In this is given the remaining portion of Prof. Stein's article on the formation of sound; and from his analysis of the motions of tuning-forks he concludes that only displacements of the nature of condensation and rarefaction yield sound: that the strength of the tones depends, among other things, on the size of the sounding mass; and that only transversal or rectilinear excursions produce resonance. With these data he explains a number of phenomena; the disproportionate loudness of forks held near the ear, &c.—MM. Kundt and Warburg give the concluding part of their researches "On friction and heat-conduction of rarefied gases." After discussing the capability of their apparatus for determining coefficients of heat-conduction, they show that these coefficients are independent of pressure within 150 mm. to about 1 mm. for air and carbonic acid, and 150 mm. to 9 mm. for hydrogen. They tried to produce an actual vacuum in regard to heat-conduction, and by drying to 200° they reduced the conduction to a small fraction of its original value. The co-efficient for hydrogen (in accordance with Maxwell's theory and Stefan's experiments) they found to be 7·1 greater than that of air; while that of carbonic acid was 0·082 of that of hydrogen, which is considerably smaller than by Maxwell's theory.—M. Edlund gives an experimental demonstration that galvanic resistance is affected by the motion of the conductor. He made a current pass in two opposite directions from the middle part of a tube, through water that was sent through the tube; and with a galvanometer proved that the resistance was less where the galvanic current went *with* the liquid one.—There is another electrical paper, in which Dr. Bleekrode recommends ebonite as preferable to glass in many ways for the discs of "electro-machines." He gives a *résumé* of the various modifications of the Holtz machine that have appeared, and describes several observations with the ebonite electro-machines.—M. Glan has a paper on the change of phase of light polarised, through reflection, parallel to the plane of incidence.—M. Emsmann describes a curious phenomenon bearing on binocular vision; while M. Vogel gives an account of spectral observations on the Red Sea and Indian Ocean, and in the blue Grotto of Capri.

Transactions of the Royal Society of New South Wales for the year 1874.—This number contains the following, among other papers:—Description of eleven new species of Terrestrial and Marine Shells from North-west Australia, by Mr. John Brazier, C.M.Z.S.—Iron Pyrites, by Mr. J. Latta.—Nickel Minerals from New Caledonia, and Iron Ore and Coal Deposits at Wallerawang, N.S.W., by Prof. Liversidge.—Some of the results of the observation of the Transit of Venus in New South Wales (with diagrams), by Mr. H. C. Russell, Government Astronomer.—The Transit of Venus as observed at Eden, by the Rev. Wm. Scott.

Bulletin de l'Académie Royale des Sciences, tom. xl. No. 8.—The two original communications in the "Classe des Sciences" are a long article on arithmetical operations, by J. C. Houzeau, and a description of some fossil plants from the "Poudingue de Burnot" (Lower Devonian), by Dr. A. Gilkinet. The two species are *Filicites pinnatus* (Cœmans) and *Filicites lepidorachis* (Cœmans), which latter Dr. Gilkinet removes from the Ferns and places among the Lycopods, under the name *Lepidodendron Burnotense*. There are three plates of figures.

SOCIETIES AND ACADEMIES

LONDON

Royal Society, Nov. 19.—"On the Physiological Action of Vanadium," by John Priestley, Platt Physiological Scholar, the Owens College, Manchester. Communicated by Prof. Gamgee, F.R.S.

Thirty-one experiments are detailed, in which frogs, a pigeon, guinea-pigs, rabbits, dogs, and cats were made use of. From these experiments it is gathered:—

1. That vanadium is a poisonous substance.

2. That the symptoms of poisoning are, in general, similar, whatever the method of the introduction of the salt into the animal system.

3. That the symptoms of poisoning which appeared in one or other of the various classes of animals above mentioned are: paralysis of motion; convulsions, local or general; rapidly supervening drowsiness, or indifference to external circumstances; congestion of alimentary mucous membranes; discharge of sanguinolent fluid fæces; presence of glairy, fluid mucus in the intestines after death; certain changes in respiration, and, coincidently, a fall in temperature; drowsiness and feebleness of pulse. In addition the heart was always irritable after death; consciousness and sensibility to pain seemed unimpaired; and no diminution could be detected in the powers of muscle and nerve to respond to stimulation.

4. That the lethal dose for rabbits lies between 9·18 mgr. and 14·66. mgr. of V_2O_5 per kilog. of rabbits.

The author details a number of experiments undertaken with

the view to gain more exact information as to the action of the salt of vanadium upon particular functions. The methods of experiment and the precautions observed are fully described.

Chemical Society, Nov. 18.—Prof. Abel, F.R.S., president, in the chair.—The Secretary read a paper by Mr. T. M. Morgan, on ethyl-phenyl acetylene.—The second communication, on narcotine, cotarnine, and hydrocotarnine, Part 2, by Mr. G. H. Beckett and Dr. C. R. A. Wright, is a continuation of their investigations of this subject.—Mr. W. Noel Hartley then gave an account of the presence of liquid carbon dioxide in mineral cavities, in which he proves, from the physical properties of the liquid enclosed in a cavity of a quartz crystal in his possession, that it is carbon dioxide.—The last paper, by Mr. W. H. Perkins, was a preliminary notice on the formation of coumarin, cinnamic and other similar acids.

Meteorological Society, Nov. 17.—Dr. R. J. Mann, president, in the chair.—Sergeant James Conroy, R.E., Morris Jones, L.R.C.P., A. H. Leycester, Sir David L. Salomons, Bart., and James P. H. Walker, were balloted for and duly elected Fellows of the Society. The following papers were then read:—Some remarks on the reduction of barometric readings with a form of table for combining the corrections for index-error, temperature, and altitude, by William Marriott. Readings of the barometer to be of any scientific value must be corrected for index-error, temperature, and height above mean sea-level. There is not much difficulty in applying the first two, but it is a very troublesome thing to obtain the proper corrections for altitude if the station be more than 100 feet above sea-level. The author has found that a great number of observers make some very extraordinary mistakes in applying this correction, and gives a few as specimens. He attributes the difficulty in applying this correction to the unsatisfactory explanation accompanying the tables as given in the different manuals on meteorology and to the fact of the corrections being only given for two pressures, viz., 27 inches and 30 inches. He then submits a table which gives the sea-level pressure on the left hand and the reading of the barometer at the station corresponding to that pressure on the right hand, with the altitude correction between them. In conclusion he submits a form of table in which is combined the corrections for index-error, temperature, and height above sea-level, which is the means of saving much time, besides reducing the liability to error.—On a continuous self-registering thermometer, by W. Harrison Cripps. The thermometer consists of six coils of glass tubing, the first five being wound concentrically round an axis, each coil lying within the other, in such a manner as to form a spiral glass wheel 4 inches in diameter. The sixth coil is moved slightly away from the others, so that it shall form the circumference of a circle 5 inches in diameter, the centre being the axis around which the spiral tube is coiled. Pivots are attached to either end of the axis, which rest on two parallel metal uprights. The tubing is filled with spirit, and mercury and a small quantity of air are enclosed in the large coil. The thermometer works in the following manner: when the spirit contracts on cooling, the expansion of the included air keeps the column of mercury in contact with it; this immediately alters the centre of gravity, and the wheel begins to revolve in a direction opposite to that of the receding mercury. On applying heat, the mercury passes forwards and the wheel moves in the opposite direction. The thermometer is made to record somewhat in the same way as the recording aneroid barometer.—On a self-regulating atmometer, by S. H. Miller, F.R.A.S. After several years' experimenting with evaporating dishes of different forms under various conditions, the author has arrived at the conclusion that none of the contrivances which have come under his own observation are entirely satisfactory. After remarking upon the conditions which a good evaporator should fulfil, he proceeds to describe a self-regulating one which he has devised and which has now worked satisfactorily for several months. The apparatus consists of an open cylinder 8 inches diameter, surmounted by a brass rain-gauge rim which receives the water from which the evaporation takes. This vessel is surrounded by another cylinder 15 inches in diameter and closed at the top, which is divided into two compartments, upper and lower. The upper one is filled with water to keep the level in the inner cylinder always constant, and the lower one receives the overflow rainfall. The amount of evaporation is determined by weighing the apparatus.

Zoological Society, Nov. 16.—Mr. Osbert Salvin, F.R.S. in the chair.—Mr. Sclater exhibited the upper horn of a Two-horned Rhinoceros that had been shot in March last by Lieut.-Col. C. Napier Sturt, in the valley of the Brahmapootra. Mr. Sclater remarked that this seemed to prove conclusively the existence of a two-horned species of Rhinoceros in Assam, which would probably turn out to be the same as that from Chittagong, now living in the Society's Gardens.—Mr. Sclater read an extract from a letter addressed to him by Dr. N. Funck, director of the Zoological Gardens, Cologne, stating that the bird figured in Mr. Sclater's recent article on the Curassows as *Pauxi galeati* var. *rubra*, was the true female of *Pauxi galeata*.—Mr. H. Seebohm exhibited and made remarks on a series of rare and interesting birds and eggs from the tundras and deltas of the Petchora River, North-eastern Russia, collected there by Mr. J. A. Harvie Brown and himself during the present year.—Mr. A. H. Garrod read some notes on the Manatee (*Manatus americanus*) recently living in the Society's Gardens.—Dr. Günther, F.R.S., read a third report on the collections of Indian reptiles obtained by the British Museum, and gave descriptions of several species new to science.—A communication was read from Mr. E. Pierson Ramsay, containing a list of birds met with in North-eastern Queensland, chiefly at Rockingham Bay.—A second communication from Mr. Ramsay gave a description of the eggs and young of *Rallina tricolor*, from Rockingham Bay, Queensland.—A third communication from Mr. Ramsay contained the description of a new species of Pæcilodryas, and a new genus and species of Bower Bird, proposed to be called *Scenopœus dentirostris*, from Queensland.—A communication was read from Mr. Sylvanus Hanley, containing the description of a new Cyclophorus and a new Ampullaria, from Burmah.—A communication was read from Dr. J. S. Bowerbank, F.R.S., containing further observations on *Alcyoncellum speciosum*, Quoy et G., and *Hyalonema mirabile*, Gray.—Mr. Arthur G. Butler read a paper on a collection of butterflies from the New Hebrides and Loyalty Islands, and gave descriptions of some new species.—A second paper by Mr. Butler contained particulars of a small collection of butterflies from Fiji. Mr. Butler also read the descriptions of several new species of Sphingidæ.—A communication was read from Mr. W. H. Hudson, containing remarks on Herons, with a notice of a curious instinct of *Ardetta involucris*.—A communication was read from Dr. Otto Finsch, in which he gave the description of a new species of Crowned Pigeon from the southern end of New Guinea, opposite Yule Island. Dr. Finsch proposed to call this bird *Goura scheepmakeri*, after Mr. C. Scheepmaker, of Soerabaya, who had transmitted a living specimen of it to the Zoological Gardens, Amsterdam.

Entomological Society, Nov. 3.—Sir Sidney Smith Saunders, C.M.G., president, in the chair.—This being the first meeting of the session in the new rooms of the Society at 11, Chandos Street, Cavendish Square, the President delivered an inaugural address, pointing out the advantages which might be expected from the library and meeting-room being brought into juxtaposition on a more central site; and also from the library being open to members during three days in each week instead of one day only.—M. Oscar Lamarche, of Liége, was elected a foreign member.—Mr. W. C. Boyd exhibited mines of *Heliozela sericiella* in oak. He had succeeded in rearing the insects by confining them with a young oak plant, and thus was enabled to discover their habits, which had hitherto been unknown. The mines were situated in the footstalks of the leaves.—Mr. M'Lachlan exhibited a living apterous female of a terrestrial Trichopterous insect, *Enoicyla* (probably *E. pusilla*, Burm.) He had recently bred it, with others, from cases forwarded to him by Mr. Fletcher, of Worcester, the discoverer of the insect in this country. Mr. M'Lachlan gave an account of its structure and singular habits. The perfect insects emerge in November, and the males are furnished with ample wings.—Mr. Champion exhibited several rare Coleoptera captured by him in Kent and Surrey.—Mr. Phipson exhibited a *Catocala nupta*, with several *Acari* on a portion of one of the anterior wings, instead of on the body, as is usually the case.—The Rev. H. S. Gorham read descriptions of some new species and a new genus of *Endomycici*.—Mr. Arthur G. Butler communicated "a list of the Lepidoptera referable to the genus *Hypsa* of Walker's list, with descriptions of new genera and species."—Mr. Edward Saunders communicated a second part of his Synopsis of the British *Hemiptera Heteroptera*.—Mr. Charles O. Waterhouse read descriptions of some new genera and species of Heteromerous Coleoptera (*Heteropidæ*), chiefly from Terra del Fuego. The specimens had been brought to this country by Mr. Charles Darwin, and had been described many years ago by Mr. Water-

house, sen., but the manuscript had been unfortunately lost, and the insects had remained unnoticed till the present time.

BERLIN

German Chemical Society, Nov. 8.—A. W. Hofmann, president, in the chair.—J. Landauer described a blowpipe-apparatus consisting of two bottles, one of which contains air, while the other, filled with water, is placed above and is connected by a tube with the air-bottle. The water replacing the air produces the blast.—T. Grabowsky has found amongst the products chlorine forms with acetone, a liquid of the formulæ $C_5H_7Cl_3O$, and another liquid $C_6H_7Cl_3O$ (trichlorinated oxide of mesitylene).—The same chemist has studied anew the transformation of chloral into chloralid and solid chloral.—P. Griess has obtained betain by the action of iodide of methyl on glycocol.—S. P. Sadler appears to have transformed glycerine into tartronic acid by means of diluted fuming nitric acid.—V. von Richter reverted to a reaction formerly observed by him, through which nitrobromobenzol and cyanide of potassium form cyanobromobenzol, and consequently a bromobenzoic acid, of which the acid group CO_2H is *not* corresponding in position to the nitro-group of the original compound. He has repeated the experiment with bibromo-nitro-benzol, and finds corresponding exchanges to take place in their case. He also described the formation of certain di-tri- and tetra-bromo-benzols.—F. Beilstein and A. Kurbatow, by adding chloride of antimony to nitrobenzol and passing chlorine gas into it, have obtained a good yield of meta-chloronitrobenzol and higher chlorides.—T. A. Roorda Smit prepares acetate of ammonium and acetamide by means of carbonate of ammonium. The same fluids, nitrobenzol and sulphite of ammonium, yield anilosulphite of ammonium $C_6H_5NHSO_3NH_4$. The same chemist has found thioanilide, $C_6H_5NH-S-NHC_6H_5$, a yellow oil, amongst the products of the reaction of chloride of sulphur on aniline.—Ira Remsen communicated researches on the action of potassium on succinate of ethyl and on the action of ozone on carbonic oxide.—The President then read to the meeting an autobiographical sketch by F. Wöhler, not intended for publication, of which the following is an extract:—His father, as well as a friend of the family, encouraged his pleasure in collecting natural objects, and experimenting. In 1814 he was sent to the grammar-school of Frankfort. He was backward particularly in mathematics, partly because he was constantly occupied in collecting minerals. Dr. Buch in Frankfort was his first serious instructor in chemistry. Buch published remarks on selenium conjointly with Wöhler. Hagen's old treatise, based on the phlogistic theory already used by his father, was his first guide, but was soon exchanged against more modern views and books. His room was changed into a chemical laboratory; he learnt to engrave on copper, and collected antiquities; but his great pleasure was the construction of a Volta-battery of 100 couples and the reduction of potassium by means of it, as well as by heat alone. He was fond of bodily exercises, such as swimming and shooting. In 1820 he went to the University of Marburg, but was offended by one of the professors, who forbade his making chemical experiments while he was studying medicine! He therefore continued his studies in Heidelberg. The great physiologist Tiedemann became his friend, and he published researches on the change that organic acids undergo through passing the human body. He obtained a prize for this paper, and used it for his dissertation as Doctor of Medicine. He still had the intention of entering into the practice of a profession. He worked in Gmelin's laboratory, but never heard any lectures on chemistry. The sketch does not enter into his life in Sweden, described in a former paper. After returning from Sweden his friendship with Liebig commenced in Frankfort, to cease ouly with Liebig's death. In 1825 Leopold von Buch proposed him as teacher of chemistry of the newly founded School of Industry (Gewerbeschule) at Berlin. He accepted the place, and was named Professor in 1828. He derived great benefit from living in friendly intercourse with Magnus, H. and G. Rose, and Mitscherlich. He remembers with enthusiasm the influence of Humboldt and his eloquence. Humboldt was president of the Association of Natural Philosophers at Berlin, and the contrast between his never-ceasing flow of language and the silence of Berzelius is humorously described in the following anecdote. During an excursion of the Association, Wöhler had to take his seat, as he says, on account of his thinness, in a carriage nearly filled already by the stoutest members of the Association, viz. Humboldt and Berzelius. The former held forth with his usual readiness, when Berzelius suddenly broke out in Swedish: "Mr. Wöhler, what eloquence! I cannot stand it any longer!" Fortunately Humboldt's all but universal knowledge did not comprise the Swedish language. In Berlin Wöhler published his text-book (Grundriss) of chemistry, at first anonymously. Soon afterwards he left Berlin for Cassel. In 1829 he visited France together with Magnus; in 1835 England. In 1836 he was named successor of Stromeyer as Professor of Chemistry in Göttingen.

PARIS

Academy of Sciences, Nov. 15.—M. Frémy in the chair.—The following papers were read:—On meridian observations of small planets at the Greenwich and Paris Observatories during the third trimestre of 1875, by M. Leverrier.—On the density of pure platinum and iridium and their alloys, by MM. Sainte-Claire Deville and H. Debray. The numbers obtained (about 21·5 for platinum and 22·4 for iridium) are higher than those found hitherto.—Researches on the composition of dissolved acids and salts, by M. Berthelot.—Memoir on measurement of the affinities between liquids of organised bodies by means of electromotive forces, by M. Becquerel. He studies the electromotive force obtained from the white and the yolk of an egg, from the arterial and venous blood of dogs, and from each of these with albumen, the reactions between plant liquids, and between them and animal liquids, the electro-capillary effects of sulphurous liquids in contact with liquid exuded from the skin, &c.—Examples of the contemporaneous formation of iron pyrites in thermal springs and in sea water, by M. Daubrée.—On the carpellary theory according to the Amaryllideæ (Part 1, Alstræmeria), by M. Trécul.—Fifteenth note on the electric conductivity of moderately conducting bodies, by M. Du Moncel.—M. Janssen presented four cases of natural history specimens from the Japanese Government.—On the representation of figures of geometry of n dimensions by correlative figures of ordinary geometry, by Mr. Spottiswoode.—On the development of the fruit of Coprini, and the supposed sexuality of the Basidiomycetes, by M. van Tieghem.—Theory of hail, by M. Cousté.—On the employment of nickel deposited electrically to protect the magnets of compasses against oxidation, by M. Duchenin.—Application of the principle of analytic correspondence to the demonstration of the theorem of Bezout, by M. Saltel.—Observations of the planet Jupiter, by M. Flammarion. He notes (*inter alia*) the appearance of white elliptic spots followed by shadows. Some sketches are given.—On some combinations of titanium, by MM. Friedel and Guérin.—Solution of platinum in sulphuric acid during the industrial process of concentration, by M. Scheurer-Kestner.—On the presence of a new alkaloid, ergotinine, in spurred rye, by M. Tanret.—On the *rôle* of carbonic acid in the phenomenon of spontaneous coagulation of blood, by M. Glénard.—Reply to MM. Mathieu and Urbain's last note on the same subject, by M. Gautier.—On the embryogeny of the flea, by M. Balbiani.—On larval forms of Bryozoa, by M. Barrois.—Note on the storms of November 6 to 11, 1875, by M. Marié-Davy.

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